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Informal Comments

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Applicant's or Agent's File reference : PCT2004KP134

Dear Sir/Madam

The Applicant, who received the Written opinion of the International Search Report relating to the above identified International Application transmitted on 08/03/2005, hereby files brief comment.

1. We have received the Written Opinion from the ISA, stating that Claims 1-5 of the present invention lack novelty and inventiveness, because they are anticipated by Reference 1 (JP 62-83444A; mentioned below as R1), and Claims 6-8 lack inventiveness, since they are obvious over the combination of R1 and Reference 2(JP 2003-277867 A; mentioned below as R2) or Reference 3 (JP 63-192838 A; mentioned below as R3). The arguments thereof can hardly be acceptable to the applicants for the reasons given as follows.
2. One of the objects of the present invention, as set forth in paragraph [0005] of the specification, is to provide an aluminum alloy which shows a high fracture toughness and well-balanced strength and ductility from room temperature to a high temperature of 300°C. To achieve the aforementioned object, this invention, as set forth in Claim 1, defines the contents of the aluminum alloy, parts of production steps thereof and the average particle

diameter of crystallized silicon. The lower limits of the contents of various elements in the aluminum alloy are determined, as in paragraphs [0015] to [0020], so as to guarantee good strength. Their upper limits are determined so as to guarantee good ductility and fracture toughness.

3. R1 discloses an aluminum alloy containing substantially the same elements as aluminum alloy according to the present invention. It is notable that the upper limit of Si content is defined in R1 so as not to deteriorate the strength of the said alloy, which leads to the extremely high value of 40% by weight. The upper limits for Fe content and Ni content, which have also been set considering ductility and fracture toughness, are much higher than the upper limits set in the present invention. This fact also indicates that R1 merely considers improving the strength of the alloy.

In addition, the contents of Cu and Mg are set so as to improve strength and hardness of alloy fully. In this respect, R1 and the present invention differ in their technical ideas how they set the contents of the alloy. The difference consists in that the upper limits for contents in the present invention are set to guarantee ductility and fracture toughness, while R1 puts stress on the strength of the alloy.

Furthermore, every example shown in Table 1 shows higher contents of Fe and Ni and many examples show higher content of Si, as in No. 6-8, and higher content of Cu as in No. 1, 5-7 than contents given by the present invention. Therefore no alloys of the same element composition as the present invention is given. Table 2, which shows material properties, reveals no ductility at a high temperature and No. 8, for example shows an extremely low Charpy value. These facts clearly exemplify that ductility and fracture toughness are not so important factors for alloys disclosed in R1.

On the other hand the alloys disclosed in the present invention have fairly low upper limits of content for Si, Fe, Ni, Cu and Mg, which ensures enough strength and improves ductility and fracture toughness at a high temperature. Therefore when the alloys derived from examples disclosed by R1 are employed in engines for racing cars which operate under high load, a breakdown is likely due to the lack of ductility and fracture toughness at a high temperature, while the alloys of the present invention remain stable even under such severe conditions.

4. As set out above, we do not accept the argumentation by ISA that Claims 1 to 5 lack novelty and inventiveness in view of R1 and Claims 6 to 8 lack inventiveness in view of R1, R2 and R3.

Very truly yours,

Patent Attorney
Kazuhisa TORII

Kazuhisa Torii